From *Semiconductor Physics and Devices: Basic Principles* (4th Edition), Donald A. Neamen, McGraw Hill, 2012, ISBN 978-0-07-352958-5.

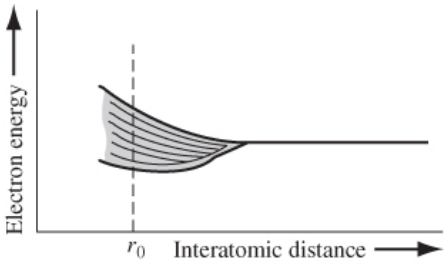

Figure 3.2 | The splitting of an energy state into a band of allowed energies.

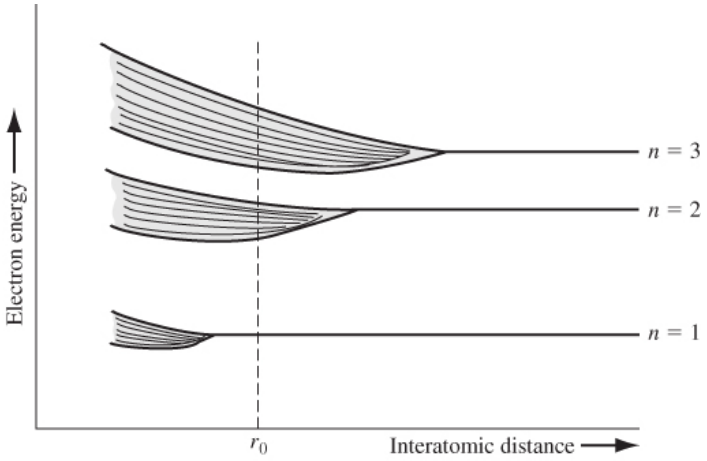

Figure 3.3 | Schematic showing the splitting of three energy states into allowed bands of energies.

- Energy states split as atoms get close enough for probability density functions of electrons to overlap, i.e., E_3 first, then E_2, …

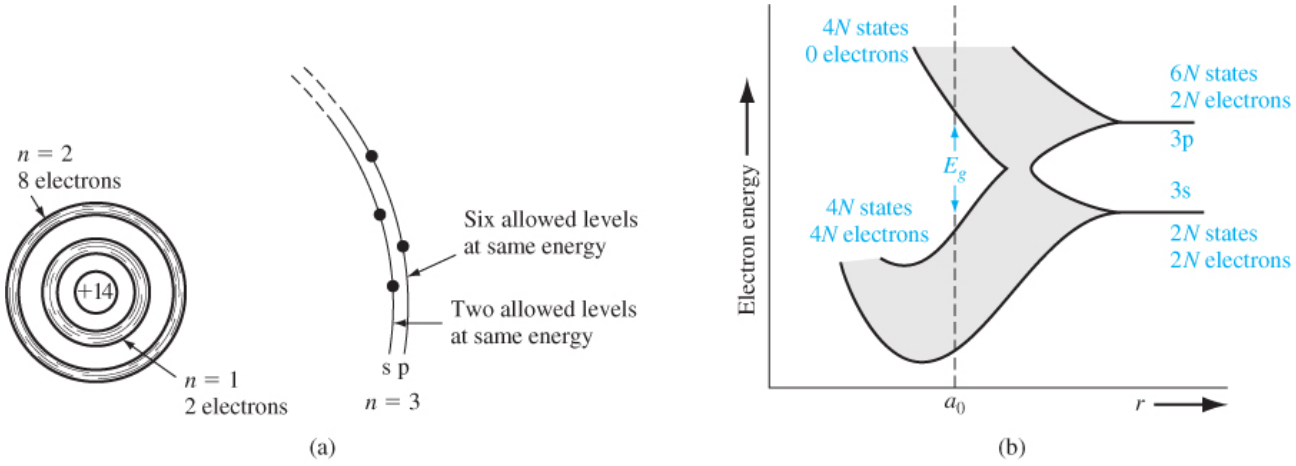

Figure 3.4 | (a) Schematic of an isolated silicon atom. (b) The splitting of the 3s and 3p states of silicon into the allowed and forbidden energy bands.
(From Shockley [6].)

- Splitting occurs for the electrons in outermost energy level (quantum number $n = 3$).